

Closure Certification

8908-15-40

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(Red)



SDMS DocID 2198382

Stormwater Retention Basin

FMC Corporation
Baltimore, Maryland

December 1988



O'BRIEN & GERE

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1676.029

CLOSURE CERTIFICATION

STORMWATER RETENTION BASIN

**FMC CORPORATION
BALTIMORE, MARYLAND**

DECEMBER 1988

**O'BRIEN & GERE ENGINEERS, INC.
1304 BUCKLEY ROAD
SYRACUSE, NEW YORK 13221**

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SECTION 1 - INTRODUCTION

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1.01 Background

FMC Baltimore utilized a Stormwater Retention Basin to collect site runoff prior to on-site treatment and discharge to municipal sewer systems. Figure 1 is a site plan showing the location of the impoundment within the FMC property. The basin was constructed during 1976 and placed in operation in March 1977.

Analysis of basin influent and contents indicated that the impoundment occasionally contained liquids with a pH greater than 12.5 or less than 2.0. Therefore, the impoundment was classified as a hazardous waste storage facility and subject to the provisions of RCRA and COMAR 10.51. A RCRA Part B application was submitted to the State of Maryland in November 1985.

FMC decided to replace the impoundment with a tank system. Evaluation of several alternatives resulted in the selection of a below grade concrete tank with a primary and secondary HDPE liner. The selected location for the replacement facility was the same as the surface impoundment to take advantage of existing waste water and storm water transfer facilities.

A Closure Plan for the surface impoundment was submitted to the State of Maryland (State) and United States Environmental Protection Agency (EPA) in June 1987. A public hearing was held in September 17, 1987 to provide an opportunity for public comment on the Closure Plan. On October 6, 1987 the State approved the Closure Plan with the modifications presented in Exhibit A.

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The construction of the replacement tank system was integral to the closure of the surface impoundment. Consequently the closure schedule, presented as Figure 2, resulted in completion of closure when the new facility was operational. The facility completed start-up testing during 1988.

1.02 Objectives

The approved Closure Plan included the submission of Closure Certification by both an independent Professional Engineer and FMC that the impoundment had been closed in accordance with the approved Closure Plan. The purpose of this Closure Certification Report is to document testing conducted during closure activities and provide a certification by an independent engineer that closure was completed in accordance with the approved Closure Plan.

SECTION 2 - CLOSURE ACTIVITIES

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2.01 Inventory Management

When construction on the impoundment began it contained stormwater runoff and residual sludge. These substances were managed differently.

The storm water was pumped from the impoundment to the existing waste water treatment system for pre-treatment prior to discharge to the Patapsco waste water treatment facility. In addition, any water which entered the construction area during closure was managed in the same way.

The residual sludge was solidified using calcium oxide in roll off boxes. The solidified material was then transferred to transport vehicles for disposal at the permitted hazardous waste management facility operated by GSX Services (SCD070375985) located in Pinewood, South Carolina. Appendix A summarizes the information on shipments of solidified residue to the GSX disposal facility. The total mass of residue stabilized and disposed of off-site was approximately 1097 tons.

2.02 Facility Decontamination

Facility and equipment decontamination included several different operations. FabriForm erosion protection was removed and where contaminated disposed of in an off-site permitted facility. Equipment used during the operation of the impoundment was either stored and reused with the replacement tank, decontaminated, or disposed of off-site at a permitted facility.

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Construction equipment was decontaminated on site, in accordance with the Closure Plan, prior to leaving the work area.

The stained FabriForm and other concrete removed from the impoundment was transported to the GSX facility in Pinewood, South Carolina. Appendix A presents a summary of shipments based on the copies of manifests retained by FMC. The total mass of FabriForm and concrete sent to GSX was approximately 504 tons.

Upon completion of residue removal and FabriForm removal the impoundment retained a portion of its clay liner. A series of tests was conducted on the liner to determine residual concentration to be encapsulated beneath the replacement tank. Appendix B presents the sample locations and test results from this effort. The results demonstrate that the residue was effectively removed prior to initiation of tank construction. The concentration of five indicator compounds in the soil at final grades was in the part per million range, demonstrating over 99.9% reduction from pre-closure concentrations.

Equipment used during construction included earth moving equipment, pile drivers, trucks, and steel sheeting. This equipment was rinsed and then steam cleaned to remove construction area residues. Prior to leaving the site the equipment was wipe tested using procedures presented in Appendix C. The results of the testing, presented in Appendix C, demonstrated that the equipment was decontaminated in accordance with the approved Closure Plan prior to leaving the construction area.

An asphalt pavement storage area was constructed as part of the closure program. The storage area was used to store soil from the impoundment area during the construction of the replacement tank. The stored soils were used to backfill against the concrete tank walls. When the asphalt area was empty it was washed down to remove residual soils. A wipe sample was collected and analyzed for selected parameters. The results of that sampling and analyses are presented in Appendix C. These results demonstrate that the closure was completed in accordance with the approved Closure Plan.

2.03 Cover Installation

A portion of the area occupied by the surface impoundment is now occupied by a smaller tank system. The remaining area was backfilled with soil from the excavation for the tank. The placed backfill was overlain by a clay cap system which was covered by asphalt.

The clay used to construct the clay cover was obtained from Campbell Sand and Gravel. Appendix D presents the results of testing conducted on the clay prior to selection for use. The results demonstrate that the clay met the specifications within the approved Closure Plan.

Prior to installation of the clay the soil backfill was compacted. Appendix E presents the results of testing done on the compacted soil. Subsequent to clay compaction samples were collected to demonstrate compliance with the approved Closure

Plan. The results presented in Appendix F demonstrate that the installed clay met the specifications contained in the approved Closure Plan.

Overlying the clay layer is a granular subbase for the asphalt cover. Appendix G presents quality control data on the granular base. The data demonstrate compliance with the approved Closure Plan.

Bound separately are as-built plans which document the construction of the replacement facility. Included within the as-built package are final grades and elevations for the concrete tank system and surrounding clay cap system. Visual inspection of the closed facility confirms that precipitation drains rapidly to the facilities sewer system in accordance with the approved Closure Plan.

2.04 Leachate Management

Rainfall and ground water infiltration to the construction area was pumped from the excavation to FMC's process waste water pretreatment facilities. The effluent was routed to the Patapsco waste water treatment facility for permitted discharge. This water management was in accordance with the approved Closure Plan.

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2.05 Closure Certification

Certification of Closure is required under 40 CFR 265 and COMAR 10.51.05.07F. I am familiar with the closure actions and the approved Closure Plan and certify that closure of the Stormwater Retention Basin has been completed in accordance with the approved Closure Plan.



Steve R. Garver, P.E.
Vice President
New York State License No. 052526



IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS HE IS ACTING UNDER THE DIRECTION OF
A LICENSED PROFESSIONAL ENGINEER, TO ALTER
THIS DOCUMENT.

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Appendices



O'BRIEN & GERE

SITE PLAN

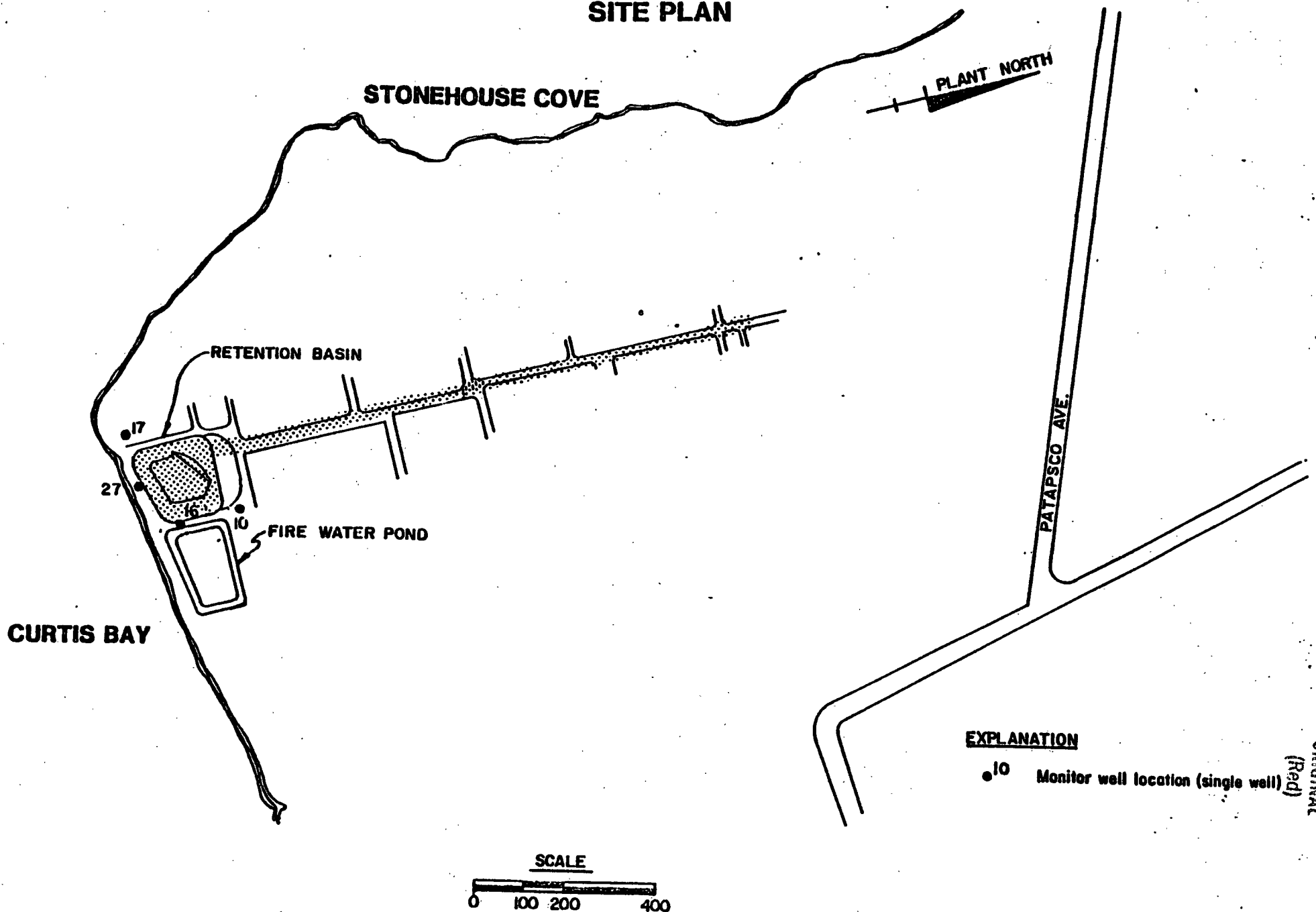


FIGURE 1

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FMC BALTIMORE STORMWATER RETENTION BASIN PROJECTED CLOSURE SCHEDULE

SUBMITTAL OF CLOSURE PLAN

INITIAL

REVISED

CLOSURE PLAN REGULATORY REVIEW APPROVAL

INTERNAL FUNDING SECURED

DETAILED ENGINEERING & SPEC.

BID PACKAGE, PURCHASING & DELIVERY

TEMPORARY PUMPING STATION

LIQUID & RESIDUE REMOVAL

SOIL EXCAVATION

TANK CONSTRUCTION

PUMP INSTALLATION & BACKFILL

PERIMETER PAVING/COVER

CLOSURE CERTIFICATION

N D J F M A M J J A S O N D J F M A M J J A S O N D
1987 1988

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FIGURE 2

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Appendices



COMING GERE

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APPENDIX A
STABILIZATION RESIDUE/FABRICATION DISPOSAL
MANIFEST SUMMARY

APPENDIX A
1 of 3APPENDIX A
STABILIZED RESIDUE DISPOSAL MANIFEST SUMMARY⁽¹⁾

DATE	MANIFEST NO.	MASS (lbs)
11/22/87	90500	33380
	90501	32560
	90502	33980
	90503	32380
11/30/87	90504	25520
	90505	22840
	90506	22120
	90507	37140
	90508	31840
	90509	38960
	90510	32940
	90511	35440
	90512	30180
	90513	32040
	90514	38160
	90515	41120
12/2/87	90516	39440
	90517	33500
	90518	36540
	90519	41120
	90520	37280
	90521	35720
	90522	22960
	90523	37620
	90524	37560
	90525	34080
	90526	35360
	90527	33220
11/4/87	90528	37960
	90529	41940
	90530	40020
	90531	33800
	90532	36780
	90533	40560
	90534	42960
	90535	42960
	90536	42980
	90537	38580
	90538	41160
	90539	40820
	90540	42480
	90541	39780
	90542	41860
	90543	38980

APPENDIX A
STABILIZED RESIDUE DISPOSAL MANIFEST SUMMARY⁽¹⁾
(continued)

DATE	MANIFEST NO.	MASS (lbs)
12/8/87	90544	29200
	90545	34820
	90546	40100
	90547	40400
	90548	39220
	90549	35220
	90550	33580
	90551	36240
	90552	33360
	90553	34080
12/9/87	90554	33060
12/10/87	90555	37820
	90556	32920
	90557	34480
	90558	35460
	90559	37260
	90560	38400
	90561	35980
	90562	34300
	90563	35180
	90564	34160
	90565	35660
12/14/87	90566	41320
	90567	40720
	90568	41420
	90569	38140
	90570	40120
	90571	40100
	90572	39480
	90573	36100
	90574	41780
	90575	35700
12/16/87	90576	35480
	90577	37680
	90578	42620
	90579	41640
	90580	40700
	90581	46320
	90582	41000
	90583	42660
	90584	38700
	90585	377620
	90586	38640
	90587	38540
	90588	35460

APPENDIX A
STABILIZED RESIDUE DISPOSAL MANIFEST SUMMARY⁽¹⁾
(continued)

DATE	MANIFEST NO.	MASS (lbs)
12/16/87	90589	35860
	90590	44760
	90591	36020
	90596	34760
	90597	34940
	90598	36820
	90599	40280
7/7/88	90103	43180
	90104	<u>44000</u>
	TOTAL	3,632,120 (1816 tons) ⁽²⁾

(1) Stabilized residue and FabriForm hauled to GSX Services of South Carolina Inc. Route #1, Pinewood, SC 29125, (803) 452-5003. SCD070375985 was 1816 tons. Approximate mass of components was as follows: residue (1097 tons), lime (215 tons), FabriForm and other concrete debris (504 tons).

(2) Estimated components:
residue - 1097 tons
lime - 215 tons
FabriForm and other concrete debris - 504 tons

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APPENDIX B

SOIL SAMPLE FIGURE/TEST RESULTS



Agricultural Chemical Group
Baltimore

APPENDIX B
1 of 15

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Interoffice

To File

Date December 31, 1987

From A. P. Dean *A.P. Dean*

cc DWHorgan
BLJohansen
CFKusiak
DWPalmer
AFShanta

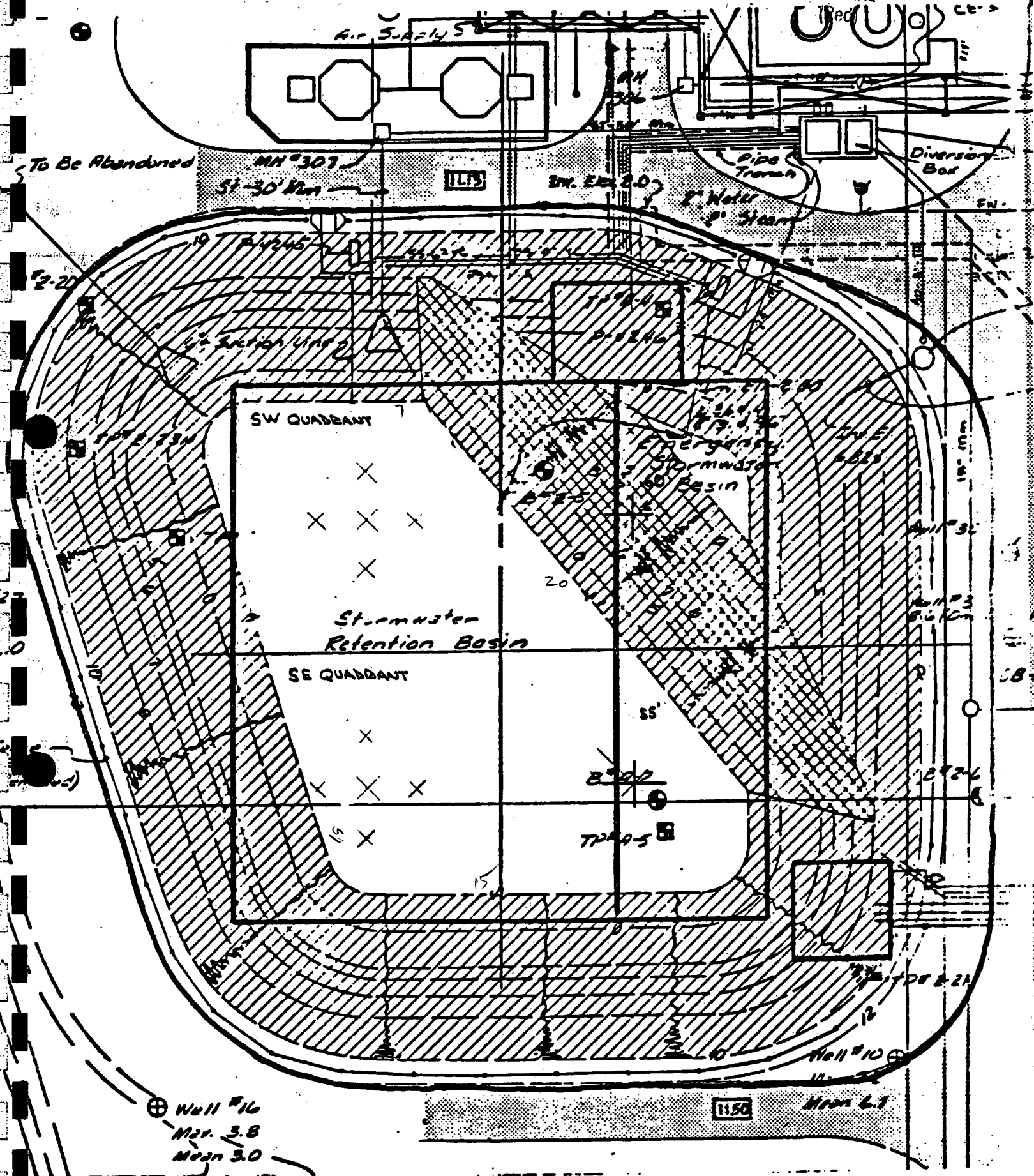
Subject RETENTION BASIN SOIL SAMPLES -
SOUTH QUADRANTS

On this date, in accordance with the requirements of the Stormwater Retention Basin Closure Plan, soil samples were collected by this writer in the two (2) south quadrants of the Basin following the Soil Testing Protocol - Section 02001 of the plan.

The attached print identifies sampling points. Only south quadrant sampling was conducted this date to accomodate construction schedules and sampling logistics. Sampling of the two (2) north quadrants will be conducted at a later date when construction grades in that area are achieved.

Samples were stored in a glass quart container, duly labeled and forwarded to the plant laboratory for the analyses set forth in the Protocol.

ct



Retention Basin - Closure Plan - Soil Sampling

DECEMBER 31, 1987 10:15-11:00AM

X = 3/4 x 3" Levan Core Sample

ARDEAN
12-31-87

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PLANT FMC
 Smpl. Date 12-31-87
 Smpl. Time 10:30 AM
 Req'd. By A.P. DEAN
 Smpl. ID SE-Soil Batch No. Retention Basin
 Analyses Req'd. Closure Plan
 Spec 02001

PLANT FMC
 Smpl. Date 12-31-87
 Smpl. Time 10:45 AM
 Req'd. By A.P. DEAN
 Smpl. ID SW Soil Batch No. Retention Basin
 Analyses Req'd. Closure Plan
 Spec 02001



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Baltimore

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Interoffice

To	File	Date	January 13, 1988
From	A. P. Dean <i>(Signature)</i>	cc	DWHorgan BLJohansen CFKusiak DWPalmer AFShanta
Subject	<u>RETENTION BASIN SOIL SAMPLE - NORTH WEST QUADRANT</u>		

On this date, in accordance with the requirements of the Stormwater Retention Basin Closure Plan, a soil sample was collected by this writer in the north west quadrant of the Basin following the Soil Testing Protocol - Section 02001 of the plan.

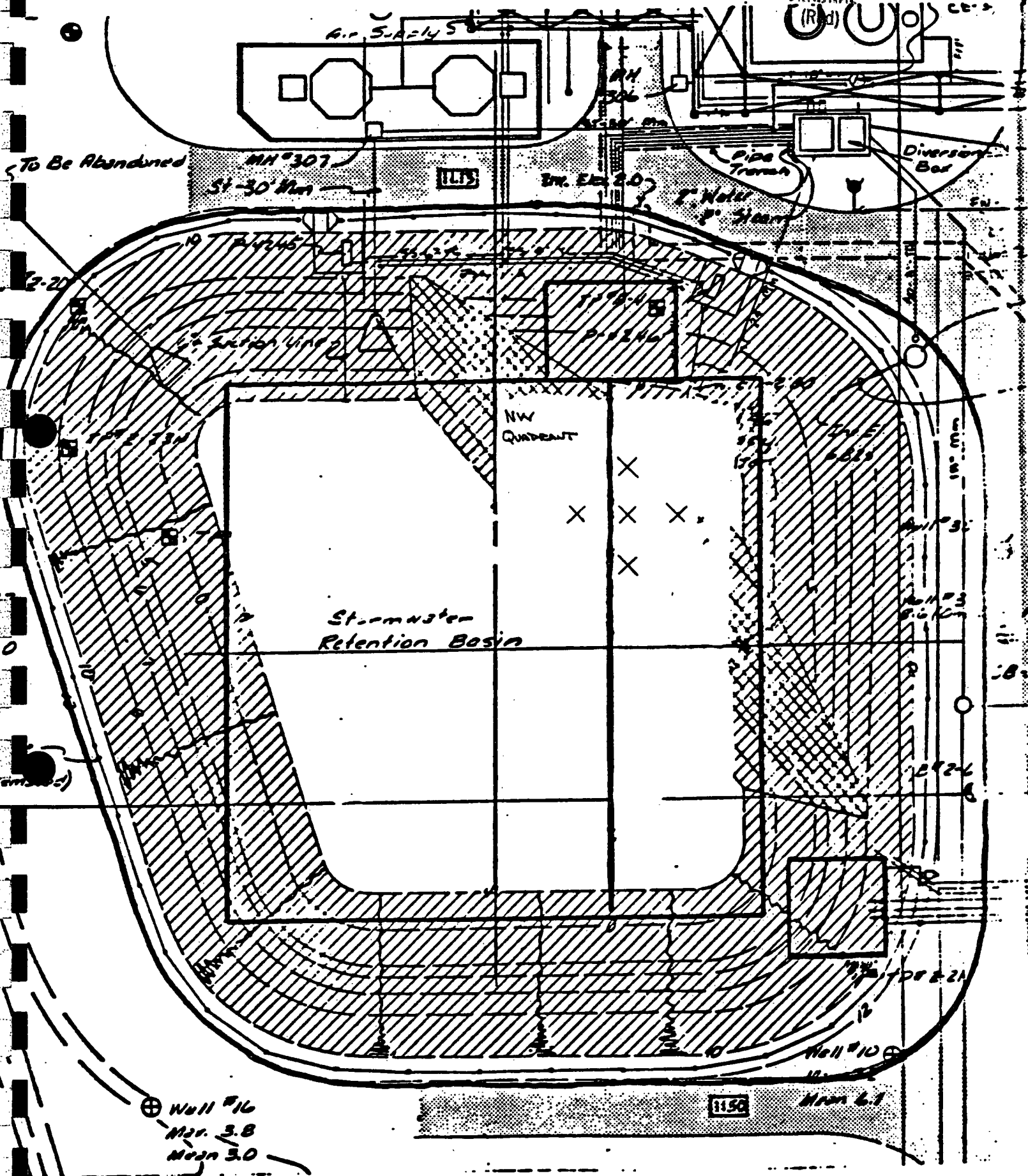
The attached print identifies sampling points. Only north west quadrant sampling was conducted this date to accomodate construction schedules and sampling logistics. Sampling of the north east quadrant will be conducted at a later date when construction grades in that area are achieved.

Samples were stored in a glass quart container; duly labeled and forwarded to the plant laboratory for the analyses set forth in the Protocol. Ms. Monica Miller of the Waste Management Administration, State Department of the Environment observed the sampling.

ct

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Retention Basin - Closure Plan - Soil Sampling

JANUARY 13, 1988

1:30 - 2:00 PM

1mm = 1 Foot

X = 3/4 x 3" LEXAN CORE Sample

ADDEAN
1-13-88

Agricultural Chemical Group
BaltimoreORIGINAL
(Red)

Interoffice

To B. L. Johansen, A. F. Shanta

Date January 13, 1988

From A. P. Dean *AP Dean*

cc

Subject RETENTION BASIN SOIL SAMPLE - NORTHWEST QUADRANT

Accompanying this memorandum is a sample of the above referenced material which is submitted for analyses. As you know the Stormwater Retention Basin Closure Plan requires that soil samples be collected from four (4) quadrants of the former Basin when all wastes have been removed and construction grades for the new tank have been met.

At this time, only the northwest section of the construction area is ready; accordingly the sample is labeled NW (north west quadrant). The sample consists of five (5) core subsamples collected from the quadrant. One (1) composite sample is to be prepared from the five (5) subsamples.

The resultant composite is to be analyzed for the following materials which have been or could have been discharged to the Basin:

- Orthonitrophenol
- Orthonitrophenol methyl ether (Ether)
- 7-Hydrogen
- 7-Nitro
- Carbon tetrachloride
- Benzene
- Monochlorobenzene
- Chloroform
- Toluene
- Claisen
- Isobuteny1

For your records, I have attached a copy of the specific Soil Testing Protocol - Section 02001 from the Closure Plan. Sampling of the remaining northeast quadrant will be done at a later date when construction grades in that area are achieved and pile installation is completed.

ct



Agricultural Chemical Group
Baltimore

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Interoffice

To File
From A. P. Dean *A.P. Dean*
Subject RETENTION BASIN SOIL SAMPLE -
NORTH EAST QUADRANT

Date February 17, 1988

cc DWHorgan
BLJohansen
CFKusiak
DWPalmer
AFShanta

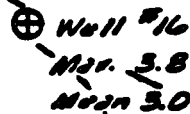
On this date, in accordance with the requirements of the Stormwater Retention Basin Closure Plan, a soil sample was collected by this writer in the north east quadrant of the Basin following the Soil Testing Protocol - Section 02001 of the plan.

The attached print identifies sampling points. Only north east quadrant sampling was conducted which concludes the State required soil sampling aspects of the project.

Samples were stored in a glass quart container, duly labeled and forwarded to the plant laboratory for the analyses set forth in the protocol.

ct

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(Rd)



FEBRUARY 17, 1988 9:00-9:30 AM

APAEU
2-17-98

x: $\frac{3}{4} \times 3"$ LEKAW Core Sample

$$1 \text{ mm} = 1 \text{ Foot}$$

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PLANT <u>FMC</u>	Arr. Time _____
Smpl. Date <u>1-13-88</u>	Comp. Time _____
Smpl. Time <u>1:50 PM</u>	Shift _____
Req'd. By <u>A.P. DEAN</u>	AU _____
Smpl. ID <u>NW-Soil</u>	Batch No. <u>RETENTION BASIN</u>
Analyses Req'd. <u>CLOSURE PLAN</u>	
<u>SPEC 02001</u>	



Agricultural Chemical Group
Baltimore

APPENDIX B
10 of 15

ORIGINAL
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Interoffice

To B. L. Johansen/A. F. Shanta

Date February 17, 1988

From A. P. Dean *A.P. Dean*

cc

Subject RETENTION BASIN SOIL SAMPLE - NORTHEAST QUADRANT

Accompanying this memorandum is a sample of the above referenced material which is submitted for analyses. As you know the Stormwater Retention Basin Closure Plan requires that soil samples be collected from four (4) quadrants of the former Basin when all wastes have been removed and construction grades for the new tank have been met.

With the collection of the northeast sample the required soil testing of the Retention Basin is concluded. The sample consists of (5) core subsamples collected from the quadrant. One (1) composite sample is to be prepared from the five (5) subsamples.

The resultant composite is to be analyzed for the following materials which have been or could have been discharged to the Basin:

- Orthonitrophenol
- Orthonitrophenol methyl ether (Ether)
- 7-Hydrogen
- 7-Nitro
- Carbon tetrachloride
- Benzene
- Monochlorobenzene
- Chloroform
- Toluene
- Claisen
- Isobutenyl

For your records, I have attached a copy of the specific Soil Testing Protocol - Section 02001 from the Closure Plan.

ct

SOIL TESTING PROTOCOL - SECTION 02001

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Testing of remaining soils for contamination from Stormwater Retention Basin contents.

B. Related Work Specified Elsewhere

1. Earthwork: Section 02000
2. Selected Fill: Section 02002
3. Solidification and Removal of Accumulated Sludge: Section 02003
4. Cover Materials and Installation: Section 02004
5. Bituminous Concrete Pavements: Section 02005

PART 2 - EXECUTION

2.01 SAMPLING

A. Sample Collection

1. The area located under the proposed 110 x 110 foot tank will be divided into four quadrants subsequent to excavation to construction required elevations.
2. Five (5) samples shall be collected from each quadrant: one from the center of each quadrant, and four at a distance of 10 feet from the center in each of four compass direction using 3/4 inch diameter Lexan^R tubing.
3. The samples shall be collected by driving the Lexan^R tube to a depth of 3 inches ± 0.5 inches and withdrawing the tubing.
4. One (1) composite sample will be prepared for each quadrant from the five (5) subsamples. The composite samples will be stored in a glass container which will be labeled as to sample location, date and sampler.

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1676.027

SOIL TESTING PROTOCOL - SECTION 02001

B. Sample Testing

1. The four composite samples will be submitted to a laboratory for analyses. The analytical program will include the following substances which have been or could have been discharged to the retention basin:

Orthonitrophenol
Orthonitrophenol methyl ether (Ether)
7-Hydrogen
7-Nitro
Carbon tetrachloride
Benzene
Monochlorobenzene
Chloroform
Toluene
Claisen
Isobutenyl

- END OF SECTION -

discuss w/ A. Shantz 10/8/27



Agricultural Chemical Group
Baltimore

APPENDIX B
13 of 15
ORIGINAL
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Interoffice

To B. L. Johansen, A. F. Shanta

Date December 31, 1987

From

A. P. Dean *A.P. Dean*

cc

Subject

RETENTION BASIN SOIL SAMPLES - SOUTH QUADRANTS

Accompanying this memorandum are two (2) samples of the above referenced material which are submitted for analyses. As you know the Stormwater Retention Basin Closure Plan requires that soil samples be collected from four (4) quadrants of the former Basin when all wastes have been removed and construction grades for the new tank have been met.

At this time, only the south section of the construction area is ready; accordingly the two (2) samples are labeled SW (south west quadrant) and SE (south east quadrant). Each of the two (2) samples consists of five (5) core subsamples collected from the respective quadrant. One (1) composite sample is to be prepared for each quadrant from the five (5) subsamples.

The two (2) resultant composites are to be analyzed for the following materials which have been or could have been discharged to the Basin:

- Orthonitrophenol
- Orthonitrophenol methyl ether (Ether)
- 7-Hydrogen
- 7-Nitro
- Carbon tetrachloride
- Benzene
- Monochlorobenzene
- Chloroform
- Toluene
- Claisen
- Isobutenyl

For your records, I have attached a copy of the specific Soil Testing Protocol - Section 02001 from the Closure Plan. Sampling of the two (2) north quadrants will be done in early January 1988 when construction grades in that area are achieved.

ct



Agricultural Chemical Group
Baltimore

APPENDIX B
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Interoffice

To A. P. Dean

Date January 29, 1988

From A. F. Shanta *as*

cc JAPalmer
DWPalmer
DWHorgan

Subject RETENTION POND CLOSING ANALYSES

The samples of soil that you took for the retention pond closing have been analyzed. Three samples were received labeled as follows:

SW soil 12/31/87 at 1045
SE soil 12/31/87 at 1030
NW soil 1/13/88 at 1350

Upon receipt the samples were refrigerated at 4°C. Before analysis, the soil in the five Lucite tubes comprising each sample were blended together. Portions of the blend were used for the analyses. The specified volatile components were determined by GC/MS using a purge and trap technique and the semi-volatile materials, after extraction, using GC ESTD (ref. FMC Methods GW-1, GW-7 and P-100). Detection limits were approximately 0.1 ppm and 10 ppm respectively for the volatiles and semi-volatiles. Results for the various parameters are given below:

<u>Component</u>	<u>Amount in ppm</u>		
	<u>SW</u>	<u>SE</u>	<u>NW</u>
Benzene	ND	ND	ND
Toluene	ND	ND	ND
Chloroform	ND	ND	ND
Chlorobenzene	0.2	2.1	0.1
Carbontetrachloride	ND	ND	ND
7-hydrogen	19	20	12
ONP	ND	ND	ND
Claisen	ND	14	22
Isobutenyl	ND	ND	ND
ONPME	162	253	175
7-nitro	44	49	36

elr



Agricultural Chemical Group
Baltimore

APPENDIX B
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ORIGINAL
(Red)

Interoffice

To A. P. Dean

Date February 23, 1988

From M. L. Schrock *MLS*

cc JAPalmer
DWPalmer
DWHorgan
AFShanta

Subject RETENTION POND CLOSING ANALYSIS

The final soil sample for the retention pond closure plan was taken and labelled NE Soil February 17, 1988 @ 0930. Please refer to your memo from A. F. Shanta dated January 29, 1988 and titled the same as this one for the methods of analysis used. The detection limits were approximately the same as before; 0.1ppm and 10ppm respectively for the volatiles and semi-volatiles with the results given below.

<u>Component</u>	<u>Amount in ppm</u>
Benzene	ND
Toluene	ND
Chloroform	ND
Chlorobenzene	ND
Carbon tetrachloride	ND
7-hydrogen	25
ONP	ND
Claisen	20
Isobutenyl	10
ONPME	301
7-nitro	62

elr

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APPENDIX C
DECONTAMINATION WIPE TEST RESULTS

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FMC CORPORATION
Agricultural Chemical Group
Baltimore, Maryland

Wipe Sampling Procedure

Discussion

Wipe testing is an indirect measure of the hazards encountered from skin contact with chemicals. If enough sites are chosen for wiping, the body of data accumulated indicates the general level of contamination. The amount of chemicals found during wipe sampling is dependent upon the nature of the surface, the desorbing liquid, the size of the area wiped, the original chemical deposition, and many other factors. This method provides for consistency in sampling, thereby reducing the number of variables present in this type of analysis. This method is consistent with the ACG method prepared by T. J. Clark.

Analytes - Any chemical that comes in contact with work surfaces, and leaves a non-volatile residue. This includes, but is not limited to, Ethion® and Pounce®.

Matrix - Any work surface where chemical residues exist. Typical areas may be valve handles, desk tops, hand rails, eating areas, door handles, and hands.

Procedure - Wiping Surface with a Kim-Wipe® moistened with isopropyl alcohol, desorbing with solvent, and gas chromatographic (GC) analysis.

Limit of Detectability

Variable, depending on the gas chromatograph and the detector. However, usually all components have a limit of detectability between 0.1 ug and 2.0 ug.

Apparatus

1. Box of Kim-Wipe® Disposable Wipes" - 5 x 8 - 1/2 inches.
2. Box of disposable plastic or neoprene gloves.
3. Bottle of rubbing alcohol (containing 70% isopropyl alcohol by volume in water).
4. Box of screw-cap glass vials with teflon cap liner for holding "wipe" samples for analysis in the laboratory.
5. Labels and tape.

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(Red)

Reagents

1. All chemicals must be A.C.S. reagent grade quality or better.
2. Isopropyl alcohol, A.C.S. reagent grade; V.W.R. catalogue #JT-9080-3.

Procedure

1. Dilute reagent grade isopropyl alcohol to 70% with distilled water. Mix well.
2. Mark off an area of 100 square centimeters with tape. This is the usual size of an area that is wiped. For areas that are not flat, such as door handles, the entire area is wiped.
3. Wear clean disposable gloves whenever taking "wipe" samples. This practice avoids contamination of the "Kim-Wipe®" by the hand and prevents skin contact with any toxic substances.
4. Remove a "Kim-Wipe®" tissue and fold the completely open tissue in half three times.
5. For WET "wipe" samples, add approximately 20 drops of the 70% isopropyl alcohol solution to the folded "Kim-Wipe®".
6. Go to the sample location and wipe the entire area with the "Kim-Wipe®". Wipe the surface firmly and completely, but not with sufficient hand pressure to damage the "Kim-Wipe®".
7. Fold the dirty side of the "Kim-Wipe®" tissue inward and wipe the same surface again.
8. Fold the dirty side inward and wipe the same surface a third time.
9. Fold the dirty side inward once again and insert it into the mouth of the glass vial. Place the cap on the vial, and mark the number or identity of the sample on the outside.
10. Wipe gloves clean after taking each sample with a clean paper towel moistened with water or isopropyl alcohol. It is suggested that gloves be changed or discarded after taking "wipe" samples in heavily contaminated areas where deposits are easily removed, or after every 10 "wipe" samples have been taken.

11. Important Note: DRY "wipe" samples are to be taken in the same way as described above, with the omission of Step 5.
12. The vials are to be returned to the laboratory for subsequent analysis.
13. A fresh piece of "Kim-Wipe®" that has not been used should be submitted to the lab in a separate vial, for use as a blank.

Prepared by: Gonnie H. Johnson
Approved by: Mary H. Bean
Date: February 13, 1987

Agricultural Chemical Group
BaltimoreORIGINAL
(Re:)

Interoffice

To File

Date July 20, 1987

From

A. P. Dean

cFDHale-O'Brien & Gere

Subject

RETENTION BASIN CLOSURE PLAN - Wipe Test

Present closure plans call for the decontamination of equipment used in closure via water wash and steam cleaning. The State is suggesting that while acceptable, the decontamination requires verification by analytical, laboratory results.

For purposes of experimentation, wipe tests were conducted on hand rails at the Retention Basin to simulate "analytical work" following decontamination if the State insists on same.

Procedure/Methodology/Standards:***Basis For Assessment**

- (1) Evaluate Potential Exposure to humans
- (2) Max. allowable concentration based on:
 - (a) For materials intended for re-use - use mammalian LD50
 - (b) Area of surface to which human could be exposed - use "standard size" of 100 ft² (surface area of 4-55 gal drums; customarily 4 drums/pallet)
 - (c) Avg. human body wgt. - 170# (77 kg)
 - (d) Safety factor = 1/10 of LD₅₀
 - (e) Contaminants to be evaluated individually

$$W = \text{allowable wgt. of contaminant per } 100\text{cm}^2$$

$$w = 100\text{cm}^2 \times 77 \text{ Kg} \times \text{LD}_{50} \times 1 \div 100\text{ft}^2 \times 929 \text{ cm}^2/\text{ft}^2 \times 10$$

$$= 0.0083 \times \text{LD}_{50}$$

***Potential Materials For Analysis**

	LD ₅₀	X	.0083 X 1000 (mg-μg)	=	Standard =μg/100cm ²
ONP	3100				25730
Ether	872				7237
7-H	2745				22783
7-NO ₂	806				6690

Page 2

	<u>LD₅₀</u>	X	<u>.0083 X 1000 (mg/g)</u>	=	<u>Standard</u> <u>=μg/100cm²</u>
CCl ₄	1770				14691
Benzene	3800				31540
MC Benzene	1540				12782
Chloroform	800				6640
Toluene	5000				41500
Claisen	2000/4000				16600/33200
Isobutenyl	1300/4436				10790/36819

*Sampling and Analysis

On July 14, 1987 at approximately 2:00PM this writer and K. H. Beach of the process lab conducted two wipe tests of the hand railing surrounding the north retention basin pump station (see photo); prior to sampling the railings were washed with warm water only and dried.

The top and bottom rail were both wiped with 70% isopropyl alcohol, diluted with 5 ml. methylene chloride and analyzed by gas chromatography for ten (10) hydroxy cmpds (including those hydroxy compounds noted above). With a detection limit of approximately 25μg/100cm₂ no hydroxy materials were found.

ct



WIPE TEST: 7/14/87 @ 2:00 PM
 Top & Bottom RAIL OF 7-ON North Ret.
 Basin Pump Station; WASHED w/ WARM H₂O
 PRIOR TO WIPE TEST

**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

SAMPLE I.D. DATE/TIME EQUIPMENT IDENTIFICATION SAMPLED BY RESULTS ($\mu\text{G}/100\text{CM}^2$) ANALYZED BY DECON.(Y or N)

	12-7-87 8:30AM	Liebherr 921 Excavator "bucket"	M.H. Bean A.D. Bean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 12-8-87	YES
	12-7-87 8:30AM	Liebherr 921 Excavator LEFT Track	M.H. Bean A.D. Bean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 12-8-87	YES
	12-9-87 2:50 PM 12-10-87 11:05 AM	J.E. McCausland, Inc "Whole of a Pump" # 4446 Pump Head (M5-13)	A.D. Bean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson	YES
	12-9-87 2:50 PM	J.E. McCausland, Inc "Whole of a Pump" # 4450 Pump Head	A.D. Bean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson	YES
	12-22-87 8:55AM	Mixing Dumpster (lime) # 1285162	A.D. Bean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 12-22-87	YES

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**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

AMPLE I.D.	DATE/TIME	EQUIPMENT IDENTIFICATION	SAMPLED BY	RESULTS ($\mu\text{G}/100\text{CM}^2$)	ANALYZED BY	DECON.(Y or N)
	12-22-87 8:35AM	Mixing Dumpster (Sludge) #1285163	A.P. Dean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 12-22-87	Yes
	12-30-87 11:45AM	Mixing Dumpster (Sludge) #1285166	A.P. Dean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 12-31-87	Yes
	12-30-87 11:50AM	Mixing Dumpster (Sludge) #1285160	A.P. Dean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 12-31-87	Yes
	1-7-88 8:20AM	Komatsu Excavator PC 200 LC "Bucket"	A.P. Dean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 1-11-88	Yes
	1-7-88 8:30AM	Komatsu Loader WA-200 "Bucket"	A.P. Dean	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 1-11-88	Yes

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**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

SAMPLE I.D.	DATE/TIME	EQUIPMENT IDENTIFICATION	SAMPLED BY	RESULTS ($\mu\text{G}/100\text{CM}^2$)	ANALYZED BY	DECON.(Y or N)
	1-7-88 8:35AM	Decou Trailer Clean Side Locker Hauler & Front #3	ADDEW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 1/11/88	NA - maintained in non-contaminated condition
	1-7-88 8:40AM	Decou Trailer Clean Side Door handle & Light Switch	ADDEW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 1/11/88	"
	1-7-88 8:45AM	Decou Trailer Clean Side Floor Area in Front of Lockers	ADDEW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 1/11/88	"
	1-29-88 8:15AM	C.J. Langenfelder Euclid #ER 99 interior bed of dump	ADDEW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 1-29-88	Yes
	2-9-88 2:50PM	C.J. Langenfelder Caterpillar D-5 # A-297 Left track	ADDEW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 2-9-88	Yes

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**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

SAMPLE I.D. DATE/TIME EQUIPMENT IDENTIFICATION SAMPLED BY RESULTS ($\mu\text{G}/100\text{CM}^2$) ANALYZED BY DECON.(Y or N)

	2-8-88 2:57pm	C.J. Langenfelder Caterpillar D-5 # A-297 Front Blade	APDEN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 2-9-88	Yes
	2-9-88 3:15pm	C.J. Langenfelder Caterpillar D3B #A371 Left track	APDEN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 2-10-88	Yes
	2-9-88 3:15pm	C.J. Langenfelder Caterpillar D3B #A371 Front Blade	APDEN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 2-10-88	Yes
	2-17-88 9:00am	C.J. Langenfelder 3873 Crane - Track + road	APDEN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 2-18-88	Yes
	2-17-88 1:00 pm	Dirt from stump pan of Caterpillar D-5	APDEN sample received from C.J. Langenfelder to R. Maclin	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO No peaks for Hydroxy compounds; ground petrol. products...	M. Schrock 2-17-88	Yes

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7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING*

SAMPLE I.D. DATE/TIME EQUIPMENT IDENTIFICATION SAMPLED BY RESULTS ($\mu\text{G}/100\text{CM}^2$) ANALIZED BY DECON.(Y or N)

	2-22-88 3:00pm	C.J. Langenfelder SH-282 Gravel Bucket	Arden	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 2-22-88	Yes
	2-25-88 1:53pm	C.J. Langenfelder Bantam C-266 Bucket (Kochring SH246)	Arden	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 2-26-88	Yes
	2-29-88 1:50pm	DRAG beam used in BASIN clean-up	Arden	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 3-1-88	Yes
	3-2-88 4:00pm	multiple sections of wooden support mat 2 Samples	Arden	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 3-2-88	Yes
	3-3-88 3:10pm	Eulis Dump Truck R-103	Arden	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 3-7-88	Yes

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**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

SAMPLE I.D. DATE/TIME EQUIPMENT IDENTIFICATION SAMPLED BY RESULTS ($\mu\text{G}/100\text{CM}^2$) ANALYZED BY DECON.(Y or N)

	3-3-88 3:15PM	Clam Bucket # 34940	APDEN1	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO <i>w/in spec</i>	B. Johnson 3-7-88	
	3-3-88 3:20PM	Cement Bucket # OB-68 R 2390.01	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO <i>w/in spec</i>	B. Johnson 3-7-88	
	3-3-88 3:25PM	Bucyrus - Erie 350 Excavator TRACT.	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO <i>w/in spec</i>	B. Johnson 3-7-88	
	3-3-88 3:30PM	Bucyrus - Erie 350 Excavator Bucket	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO <i>w/in spec</i>	B. Johnson 3-7-88	
	3-7-88 1:45PM	Door handle dirty side - door bench light switch (inside)	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO <i>w/in spec</i>	B. Johnson 3-9-88	

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**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

SAMPLE I.D. DATE/TIME EQUIPMENT IDENTIFICATION SAMPLED BY RESULTS ($\mu\text{G}/100\text{CM}^2$) ANALYZED BY DECON.(Y or N)

	3-7-88 1:50PM	Decon trailer floor of lavatory	APDEAN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO	w/in spec	B. Johnson 3-9-88	
	3-7-88 2:00PM	Decon trailer clean side - door knob light switch (inside)	APDEAN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO	w/in spec	B. Johnson 3-9-88	
	3-8-88 10:00AM	Cat Excavator - 950 H-116 Blade	APDEAN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO	w/in spec	B. Johnson 3-9-88	
	3-8-88 10:00AM	Cherry Picker 2H-256 Hook & Pulley	APDEAN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO	w/in spec	B. Johnson 3-9-88	
	3-8-88 10:00	I-Beams 20% Sampled; all decont 4 Samples	APDEAN	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO	w/in spec all 4 samples	B. Johnson 3-9-88	

**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

SAMPLE I.D.	DATE/TIME	EQUIPMENT IDENTIFICATION	SAMPLED BY	RESULTS ($\mu\text{G}/100\text{CM}^2$)	ANALYZED BY	DECON.(Y or N)
	3-10-88 1:10PM	C.J.L. office trash Floor area	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 3-11-88	yes
	3-10-88 1:15PM	C.J.L. office trash Door knob & light switch	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson 3-11-88	yes
	8-30-88 9:00AM	Spoil Area Asphalt Pav SW-corner	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	D. Johnson 9-7-88	yes
	8-30-88 9:00AM	Spoil Area Asphalt Pav SE-corner	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson	yes
	8-30-88 9:10AM	Spoil Area Asphalt Pav NE-corner	APDENW	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	B. Johnson	yes

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**7-OH RETENTION BASIN
DECONTAMINATION & WIPE TESTING***

SAMPLE I.D. DATE/TIME EQUIPMENT IDENTIFICATION SAMPLED BY RESULTS (μ G/100CM²) ANALYZED BY DECON.(Y or N)

	8-30-83 9:00AM	Spoil Area Asphalt Pave NW-corner	AL-2-A1	7-H ONPME CLAISEN ISOBUTENYL 7-NITRO w/in spec	R. Johnson	Y
				7-H ONPME CLAISEN ISOBUTENYL 7-NITRO		
				7-H ONPME CLAISEN ISOBUTENYL 7-NITRO		
				7-H ONPME CLAISEN ISOBUTENYL 7-NITRO		
				7-H ONPME CLAISEN ISOBUTENYL 7-NITRO		

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APDean

**7-OH RETENTION BASIN
SHEET PILES
Decontamination and Wipe Testing***

<u>Sheet No.</u>	<u>Sample Date/Time</u>	<u>Sampled By</u>	<u>Results (ug/100 cm²)</u>	<u>Analyzed By</u>	<u>Decon. Yes/No</u>
#15	6-3-88 2:45 PM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
#16	6-3-88 2:50 PM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
#17	6-3-88 2:55 AM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
#18	6-3-88 3:00 PM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
			7-H - ONPME - Claisen - Isobutenyl 7-Nitro		

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APDean

**7-OH RETENTION BASIN
SHEET PILES
Decontamination and Wipe Testing***

Sheet No.	Sample Date/Time	Sampled By	Results (ug/100 cm ²)	Analized By	Decon. Yes/No
#81	5-26-88 3:20 PM	APDean	7-H - ONPME - w/in Claisen - specs Isobutenyl 7-Nitro	B. Johnson	Yes
#81	6-1-88 9:00 AM	APDean	7-H - ONPME - w/in Claisen - specs Isobutenyl 7-Nitro	B. Johnson	Yes
#85	6-1-88 9:05 AM	APDean	7-H - ONPME - w/in Claisen - specs Isobutenyl 7-Nitro	B. Johnson	Yes
#86	6-1-88 9:10 AM	APDean	7-H - ONPME - w/in Claisen - specs Isobutenyl 7-Nitro	B. Johnson	Yes
#89	6-1-88 9:15 AM	APDean	7-H - ONPME - w/in Claisen - specs Isobutenyl 7-Nitro	B. Johnson	Yes

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APDean

7-OH RETENTION BASIN
SHEET PILES
Decontamination and Wipe Testing*

Sheet No.	Sample Date/Time	Sampled By	Results (ug/100 cm ²)	Analized By	Decon. Yes/No
#44	5-26-88 7:10AM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
#40	5-26-88 7:15AM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
#49	5-26-88 7:20AM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
#45	5-26-88 7:25AM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes
#57	5-26-88 3:15PM	APDean	7-H - ONPME - Claisen - Isobutenyl 7-Nitro w/in spec	B. Johnson	Yes

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APPENDIX D
CLAY SOURCE TEST DATA

File 10-6-8

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(Red)
your copy for
I have copy



Professional Service Industries, Inc.
PTL Division

DWH

June 23, 1988

FMC
Agricultural Chemical Group
1701 East Patapsco Avenue
Baltimore, Maryland 21226

Attention: Mr. Clem Kusiak

RE: Laboratory Test Results
Sample: Campbell Sand & Gravel
FMC Retention Pond
Baltimore, Maryland
PSI No.: 427-80004-090

Gentlemen:

As requested, Professional Service Industries, Inc. performed laboratory tests on the above referenced materials. Test results are as follows:

Maximum Dry Density and Optimum Moisture

The maximum dry density and optimum moisture of the soil was determined per ASTM D-1557 Method A, test method for Moisture-Density Relations of Soils. The maximum dry density was determined to be 105.3 pounds per cubic foot. The optimum moisture was determined to be 16.0%.

Additional information of this test is enclosed.

Liquid Limit, Plastic Limit, and Plasticity Index

The liquid limit, plastic limit, and plasticity index of the soil was determined per ASTM D-4318-84. The soil was determined to have a liquid limit of 48, a plastic limit of 26, and a plasticity index of 22.

Per the unified Soil Classification System the material is considered to be a type of ML-CL material. A copy of the Unified Classification chart is enclosed for your information.

Professional Service Industries

ORIGINAL
(Red)

FMC

June 23, 1988

Page 2 of 2

Permeability Test

The coefficient of permeability for this material at 95.3% compaction is 3.003×10^{-8} cm/sec. Material will need to be processed to break up material.

If you have any questions, feel free to contact me at your convenience.

Respectfully submitted,
PTL Division



Jeffrey A. Grueter
Division Manager

JAG:sml

Enclosures



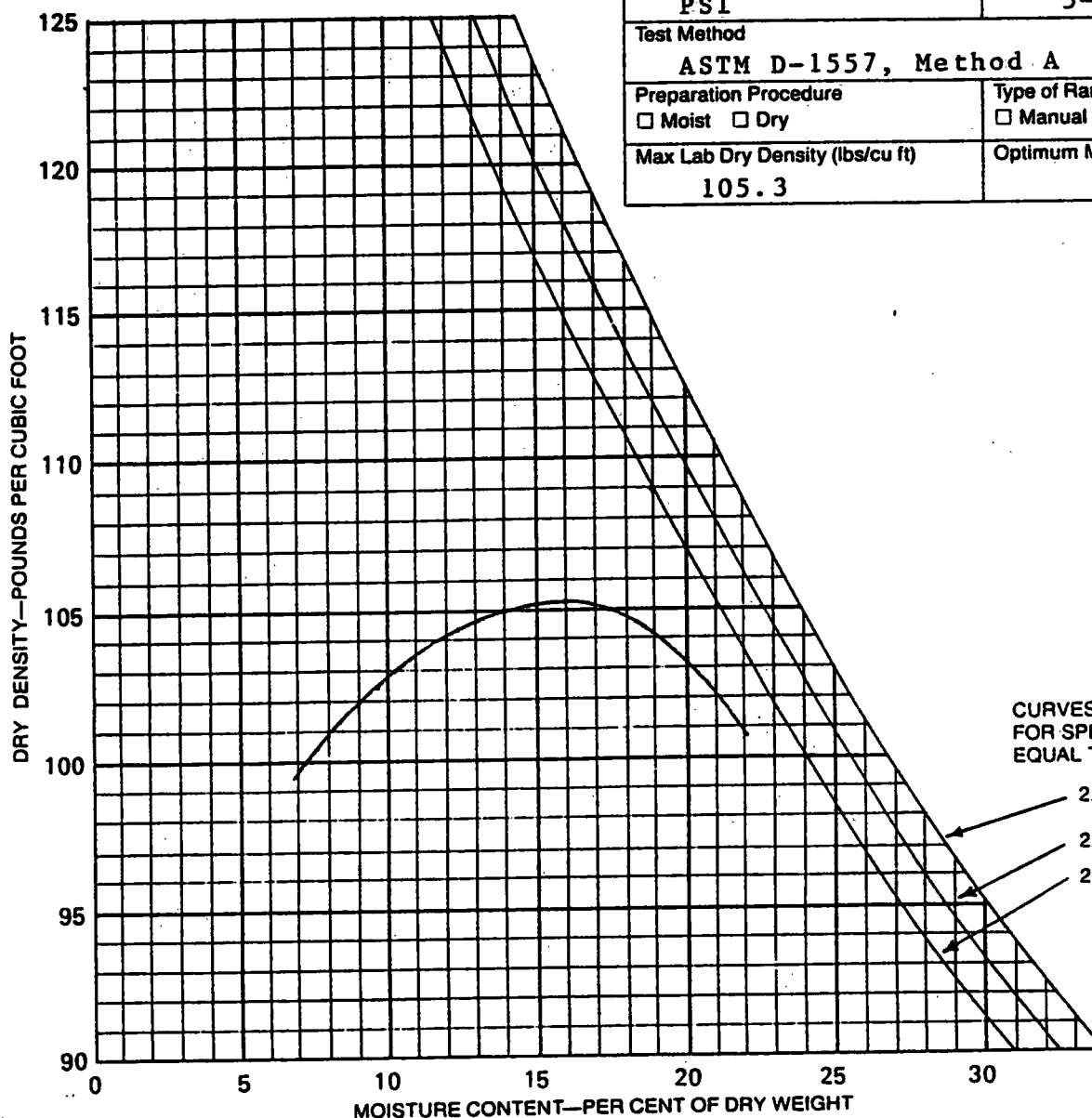
Professional Service Industries, Inc.
PTL Division

806 Barkwood Court, Suite K
Linthicum, Maryland 21090
301/789-3224

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MOISTURE DENSITY RELATIONSHIP TEST REPORT

Project FMC Retention Pond Baltimore, Maryland	Report Date 6-23-88	Report No. 090	PTL Order No. 427-80004
	Client Order No. 058940	Page 1 of 1	Lab No. 88096
Client FMC Agricultural Chemical Group 1701 E. Patapsco Avenue Box 1616 Baltimore, Maryland 21203	Source of Sample Campbell sand & gravel		
	Soil Description Grey CLAY with trace fine sand		
Sample Submitted By PSI		Date Sample Received 5-2-88	
Test Method ASTM D-1557, Method A			
Preparation Procedure <input type="checkbox"/> Moist <input type="checkbox"/> Dry		Type of Rammer <input type="checkbox"/> Manual <input type="checkbox"/> Mechanical	
Max Lab Dry Density (lbs/cu ft) 105.3		Optimum Moisture (%) 16.0	



CURVES OF 100% SATURATION
FOR SPECIFIC GRAVITY
EQUAL TO:

2.80

2.70

2.60

Distribution/Remarks

Client (1)

Submitted By:

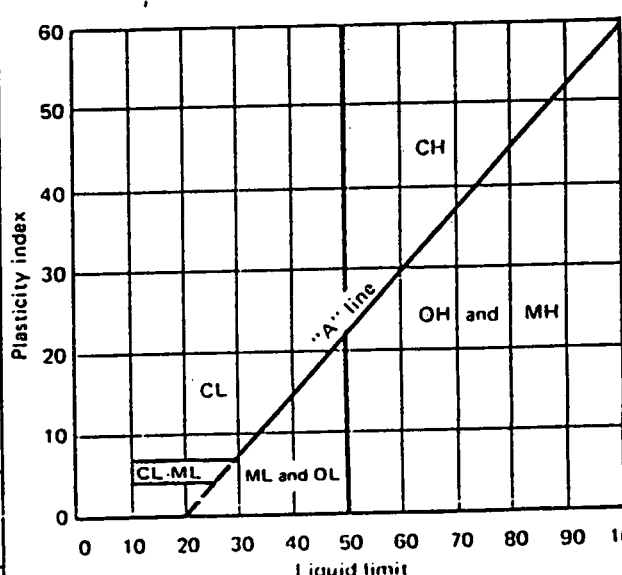
Manager

U.S. STANDARD SIEVE OPENING IN INCHES										U.S. STANDARD SIEVE NUMBERS										HYDROMETER									
6 4 3 2 1 1/2 1 3/4 2 3/4 3 1/2 4 6 8 10 14 20 30 40 50 70 100 140 200																													
PER CENT FINER BY WEIGHT																				PER CENT COARSER BY WEIGHT									
100 90 80 70 60 50 40 30 20 10 0																				0 10 20 30 40 50 60 70 80 90 100									
500 100 50 10 5 1 0.5 0.1 0.05 0.01 0.005 0.001																				GRAIN SIZE IN MILLIMETERS									
COBBLES		GRAVEL				SAND				SILT OR CLAY																			
		COARSE		FINE		COARSE		MEDIUM		FINE																			
Boring No.	Sample No.	Elev. or Depth	Classification				Net w %	LL	PL	PI	Project																		
			Dark grey CLAY					48.0	25.8	22.2	FMC Retention Pond																		
REPORT OF SOIL ANALYSIS										File No. 427-80004-090																			

APPENDIX D
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 (Red)

UNIFIED SOIL CLASSIFICATION SYSTEM

U.S. ARMY CORPS OF ENGINEERS - U.S. WATER AND POWER RESOURCES AGENCY - ASTM D2487 (Red)

Major divisions			Group symbols	Typical names	Laboratory classification criteria		
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW		
		Gravel with fines (Appreciable amount of fines)	GM	d	Silty gravels, gravel-sand-silt mixtures	Atterburg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 borderline cases requiring use of dual symbols
				u			
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	GC	Clayey gravels, gravel-sand-clay mixtures	Atterburg limits above "A" line with P.I. greater than 7		
			SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		
	Sands with fines (Appreciable amount of fines)	SP	SM	d		u	Poorly graded sands, gravelly sands, little or no fines
					SC		
		Clayey sands, sand-clay mixtures	Atterburg limits above "A" line with P.I. greater than 7	Limits plotting in hatched zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.			
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silt and Clays (Liquid limit greater than 50)	Silt and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL	Organic silts and organic silty clays of low plasticity			
		Highly organic soils	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH	Inorganic clays of high plasticity, fat clays			
			OH	Organic clays of medium to high plasticity, organic silts			
	Pt	Peat and other highly organic soils					

*Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterburg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

**Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

Fines (silt or clay)**	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Coarse Gravel	Cobbles
Sieve Sizes	270 200 140 60 40 20 10 4 3/8 3/4 3					

**The L.L. and P.I. of "Silt" plot below the "A" line on the plasticity chart, Table 4, and the L.L. and P.I. for "Clay" plot above the "A" line.



Professional Service Industries, Inc.
Pittsburgh Testing Laboratory Division

850 Poplar Street
Pittsburgh, Pennsylvania 15220
412/922-4000

REPORT

No. 1

ORDER NO. 427-80004

DATE June 2, 1988

Client: FMC Corporation
Report of: Results of Permeability Test
Report to: PSI - Baltimore
Project: N/A
Sample Identification: No. 1
Sample Represents: Shale
Samples Submitted by: PSI - Baltimore

PERMEABILITY TEST RESULTS

Sample No.	Remolded Data		Compaction (%)	Coefficient of Permeability (cm/sec)
	Dry Density (pcf)	Moisture Content (%)		
1	100.4	17.2	95.3	3.003×10^{-8}

Note: Test made on material crushed thru a No. 4 sieve and remolded to 95% of the maximum dry density furnished by PSI - Baltimore.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.
PITTSBURGH TESTING LABORATORY DIVISION
Geotechnical Services

ms

ORIGINAL
(Red)



O'BRIEN & GERE

May 6, 1988

9.3.5

M.A. Bongiovanni, Inc.
1400 Jamesville Ave.
P.O. Box 147 - Colvin Station
Syracuse, N.Y. 13205

Dear Mike:

Your letter dated May 3 submitted test results for cover material to be used around the Stormwater Retention Tank. The submission was in accordance with Contract C Section 2004 Part 2 2.01. The attached test report was reviewed relative to the specifications and the reported permeability was $8,395 \times 10^{-8}$ cm/sec, slightly above the specification of 1×10^{-8} cm/sec. The clay tested will meet the objective of the cover system. Consequently, the tested clay for the clay cover specified in the Contract Documents is approved.

If you have any questions, please contact me at (315) 451-4700.

Very truly yours,

O'BRIEN AND GERE ENGINEERS, INC.

Frank Hale
Research Manager

cc: S.W. Anagnost
C.F. Kusiak
D.M. Gresko

S. Wescott

[illegible]

M. A. BONGIOVANNI, Inc.

RECEIVED
MAY 3 - 1988
O'BRIEN & GERE
SYRACUSE, N.Y.

GENERAL CONTRACTOR

1400 JAMESVILLE AVE.
P.O. BOX 147 - COLVIN STA.
SYRACUSE, N.Y. 13205
315-475-9937

FAX 315-475-3620

May 3, 1988

O'Brien & Gere Engineers
Attn: Don Gresko
1304 Buckley Road
Syracuse, NY 13221

Dear Don:

Attached find two (2) copies of test results on our proposed clay cover material. The tests indicate compliance with specification on all items with the exception of the permeability factor.

Specs call for a maximum of 1×10^{-8} CM/SEC while our material is extremely close at 8.395×10^{-8} CM/SEC. We would think that this material still falls within the "clay" classification.

Anticipating a potential problem, we are arranging for tests to be run on a sample from another source (Campbells Sand & Gravel). However, these tests take approximately 3 - 4 weeks for results.

In light of this, we ask that the material from Jos. J. Hock's pit be accepted so that we can be assured of a source as the work is scheduled to begin June 9th, 1988.

If Campbells product has better factors, we will use that material if you desire. We just don't want to be caught short.

We would appreciate your consideration on this matter. Please let us know as soon as possible so we can plan accordingly.

Very truly yours,

M. A. BONGIOVANNI, INC.


Michael Bongiovanni

MB:dbl
Enclosures

cc: Glen Zuziak

ORIGINAL
(Red)

APPENDIX E
COMPACTED SOIL BACKFILL TEST RESULTS



FIELD DENSITY TESTS

Project Name: FMC
Client's Name: BOJ GIOVANNI
General Contractor: BOJ GIOVANNI
Excavator: BOJ GIOVANNI

PSI Job No.: 427- 90004 24
Client Job No.: _____
Date: 6-22-88
Weather: SUNNY Temp. (°F): 100°

TEST NO.	MOISTURE (%)	DRY DENSITY (PCF)	PROCTOR NO. *	% OF PROCTOR		PASS	FAIL	**	ELEVATION BELOW FINISH GRADE (FT.)	LOCATION GRID COORDINATES OR ROADWAY STATION
				SPEC	ACTUAL					
1	14.7	102.6	1	90	95.3	✓			0	20'W 5'N FROM THE NORTH CORNER
2	13.6	110.1			95.7	✓			1	20'N 5'W
3	20.5	103.6			90.1	✓				30'N 50'W
4	14.3	112.2			92.2	✓				80'W 10'N
5	13.5	108.3	1		94.1	✓				10'S 95'W
6	15.0	103.9	1		90.3	✓				40'S 80'W
7	12.6	105.0			91.3	✓				60'S 110'W
8	15.6	108.1			92.0	✓				85'S 90'W
9	15.4	108.3	1		94.1	✓				10'E
10	11.4	114.2	1	90	99.2	✓			V	30'S 40'E

Compaction Equipment Used: Vibratory ☒ Non-Vibratory ☐

Smooth Steel Drum ☐ Sheepfoot ☒ Brickfoot ☐ Rubber-tired ☐
Vibratory Plate ☐ Jumping Jack ☐ Walk Behind Steel Drum ☐ Other: _____

- (1) Test Location Established By: Grid Lines ☐ Control Points ☐ Estimation ☒ Contractor ☐
(2) Depth Or Elev. Of Test Established By: Survey ☐ Grade Stakes ☐ Estimation ☒ Contractor ☐
(3) Test Conducted On: Full Time Basis ☐ Intermittent Basis ☐

* Proctor No.	Maximum Density (PCF)	Opt. Moisture (%)	Std. Proctor	Mod. Proctor	** Codes: (AR) - Area Re-Rolled (ART) - Area Re-Rolled & Re-Tested (R-X) - Retest Of Test No. X
1	115	14.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	

Remarks:

SPEC. CALLS FOR 90% BY CLIENT

Technician: Bruce Cain Date: 6-22-88 Approved: _____ Field Copy Given To Client Yes ☐ No ☐



PTL Division

FIELD DENSITY TESTS

Project Name: FMC
 Client's Name: BRIDGEMAN CONSTRUCTION
 General Contractor: BRIDGEMAN CONSTRUCTION
 Excavator: BRIDGEMAN CONSTRUCTION

PSI Job No.: 427- 80004 3/4
 Client Job No.: _____
 Date: 6-22-88
 Weather: SUNNY Temp. (°F): 100°

TEST NO.	MOISTURE (%)	DRY DENSITY (PCF)	PROCTOR NO. *	% OF PROCTOR		PASS	FAIL	**	ELEVATION BELOW FINISH GRADE (FT.)	LOCATION GRID COORDINATES OR ROADWAY STATION
				SPEC.	ACTUAL					
11	14.5	106.4	1	70	75.5	/			0	60'S 10'E From THE NORTH CORNER OF THE TANK
12	12.6	113.7		70	78.9	/			0	80'S 35'E

Compaction Equipment Used: Vibratory ☒ Non-Vibratory ☐
 Smooth Steel Drum ☐ Sheepfoot ☒ Brickfoot ☐ Rubber-tired ☐
 Vibratory Plate ☐ Jumping Jack ☐ Walk Behind Steel Drum ☐ Other: _____

(1) Test Location Established By: Grid Lines ☐ Control Points ☐ Estimation ☒ Contractor ☐
 (2) Depth Or Elev. Of Test Established By: Survey ☐ Grade Stakes ☐ Estimation ☒ Contractor ☐
 (3) Test Conducted On: Full Time Basis ☐ Intermittent Basis ☐
 * Proctor No. Maximum Density (PCF) Opt. Moisture (%) Std. Proctor Mod. Proctor ** Codes: (AR) - Area Re-Rolled
115 14.5 ☐ ☒ (ART) - Area Re-Rolled & Re-Tested
☐ ☐ (R-X) - Retest Of Test No. X
☐ ☐

Remarks: _____

Technician: Bruce Cain Date: 6-22-88 Approved: _____ Field Copy Given To Client Yes ☐ No ☒

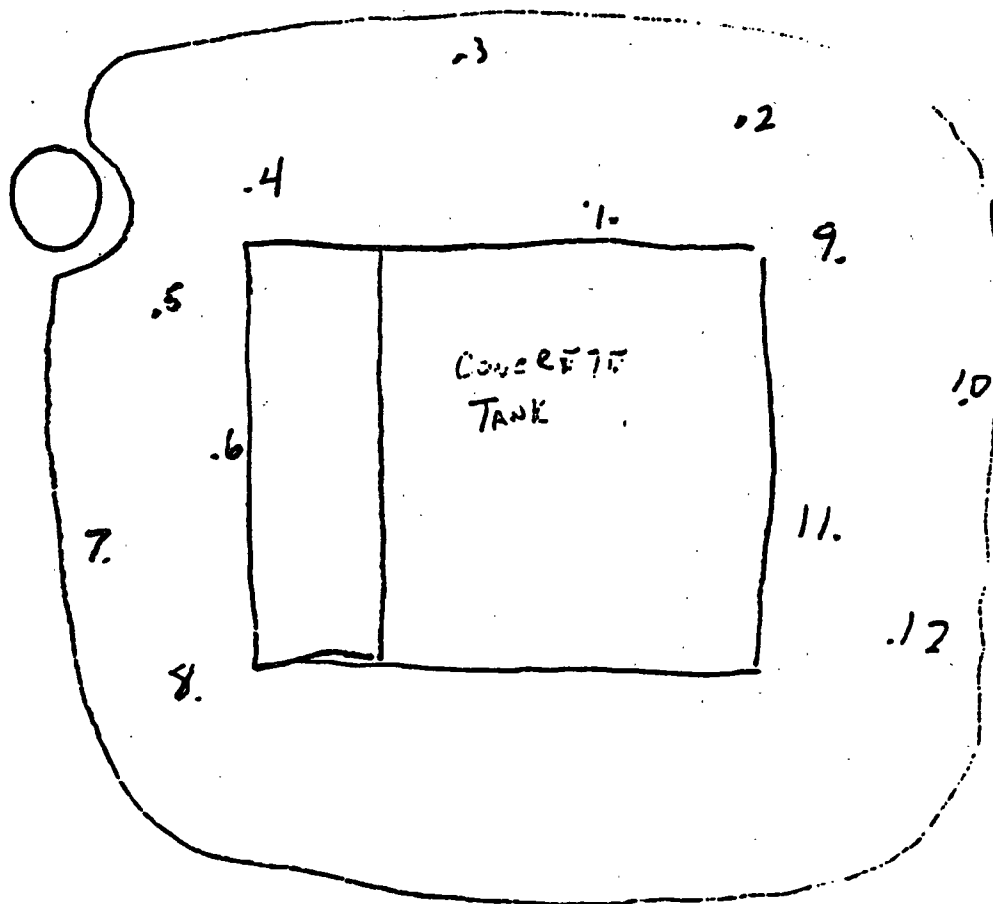
APPENDIX E
2 of 3
ORIGINAL
12/1/88



FMC

SKETCH

PLANT



BAY

ORIGINAL
(Red)

APPENDIX F
COMPACTED CLAY TEST RESULTS

File 10.6.0



Professional Service Industries, Inc.
PTL Division

ORIGINAL
(Red)

REPORT OF INSPECTION SERVICES

TESTED FOR: FMC
Agricultural Chemical Group
1701 E. Patapsco Avenue
Box 1616
Baltimore, Maryland 21203

PROJECT: FMC
Retention Pond
Baltimore, Maryland
P. O. No. 058940

Attn: Mr. Clem Kusiak
July 15, 1988

OUR REPORT NO: 427-80004-095

DATE:

REMARKS:

SUMMARY OF INSPECTION

As requested, a PSI representative was on site between 10:15 am and 11:15 am to monitor and test fill placements in area around the west, north, and east side 10' off the pond.

These services were performed on a full-time basis.

CONDITIONS REQUIRING CORRECTION - CORRECTIVE ACTION TAKEN

Attachments: Field Density Tests Report
Sketch

Respectfully submitted,
Professional Service Industries, Inc.

FIELD DENSITY TESTS

Project Name: FMC RETENTION POND
Client's Name: FMC
General Contractor: BON GIOVANNI
Excavator: BON GIOVANNI

PSI Job No.: 427- 80004 2
3
Client Job No.: _____
Date: 7-15-88
Weather: SUNNY Temp. (°F): 95

[illegible]

Compaction Equipment Used: Vibratory ☒ Non-Vibratory ☐

Smooth Steel Drum ☐ Sheepsfoot ☐ Brickfoot ☐ Rubber-tired ☐
Vibratory Plate ☐ Jumping Jack ☐ Walk Behind Steel Drum ☐ C

(1) Test Location Established By: Grid Lines ☐

Control Points ☐

Estimation ☐

Contractor ☐

(2) Depth Or Elev. Of Test Established By: Survey ☐

Grade Stakes ☐

Estimation ☐

Contractor ☐

(3) Test Conducted On: Full Time Basis ☐

Intermittent Basis ☐

* Proctor No.

Maximum Density (PCF)

Opt. Moisture (%)

Std. Proctor

Mod. Proctor

* * Codes: (AR) - Area Re-Rolled

(ART) - Area Re-Rolled & Re-Tested

(R-X) - Retest Of Test No. X

Remarks:

Technician:

Date: 7-15-88

Approved:

Field Copy

Given To Client Yes ☐ No ☐

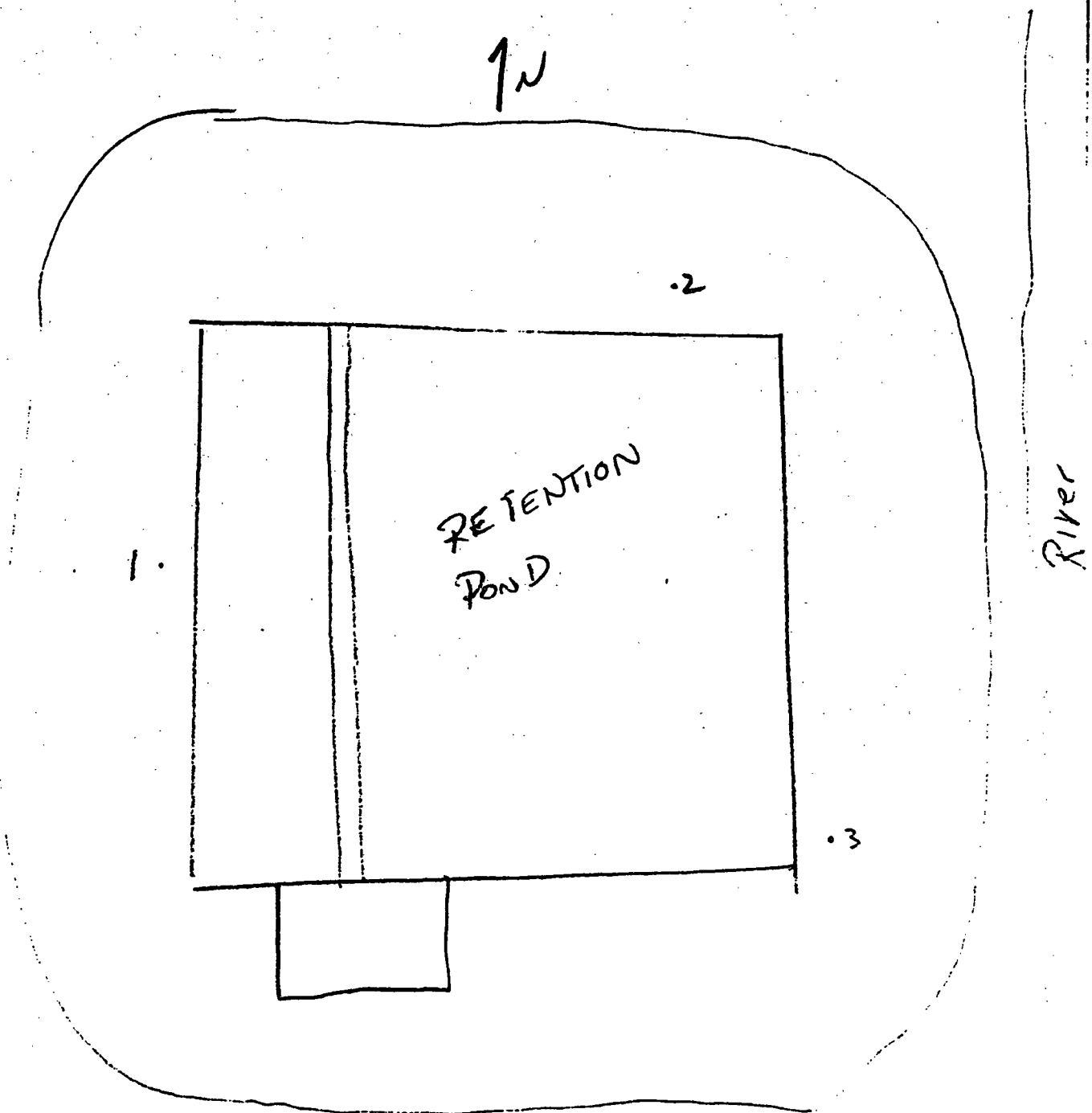
(Rad)

2 of 7



(Red)

SKETCH



ORIGINAL
(Red)



Professional Service Industries, Inc.
PTL Division

REPORT OF INSPECTION SERVICES

TESTED FOR: FMC
Agricultural Chemical Group
1701 E. Patapsco Avenue
Box 1616
Baltimore, Maryland 21203

PROJECT: FMC
Retention Pond
Baltimore, Maryland
P. O. No.: 058940

Attn: Mr. Clem Kusiak
June 28, 1988

OUR REPORT NO: 427-80004-091

DATE:

REMARKS:

SUMMARY OF INSPECTION

As requested, a PSI representative was on site between 11:30 am and 3:30 pm to monitor and test fill placements in area around retention pond 50' surrounding.

These services were performed on a full-time basis.

CONDITIONS REQUIRING CORRECTION - CORRECTIVE ACTION TAKEN

During our visit non-compliances were encountered regarding fill placements.

These non-compliances along with corrective measures are listed in the attached test reports.

Attachments: Field Density Tests Report
Sketch

Distribution: Client (1)

Respectfully submitted,
Professional Service Industries, Inc.



FIELD DENSITY TESTS

Project Name: FMP RETROTEN ROAD

Client's Name: THE

General Contractor: B. J. GIOVANNI

Excavator: B. J. GIOVANNI

PSI Job No.: 427- 80004

Client Job No.: 2/4

Date: 6/28/88

Weather: SUNNY Temp. (°F): 80°

TEST NO.	MOISTURE (%)	DRY DENSITY (PCF)	PROCTOR NO. *	% OF PROCTOR		PASS	FAIL	**	ELEVATION BELOW FINISH GRADE (FT.)	LOCATION GRID COORDINATES OR ROADWAY STATION
				SPEC.	ACTUAL					
1	20.4	96.4	1	90	91.4	✓			-14"	80'SW From North corner
2	17.0	93.9			91.1		✓	ART		30'W 40'S
3	17.6	94.1			90.3		✓	ART		10'W
4	17.0	94.6			93.1	✓				100'S
5	15.2	91.2			92.3	✓				70'S 30'E
6	14.5	100.8			95.6	✓				40'S 30'E
7	16.3	95.8			90.8	✓		R-2		30'W 40'S
8	15.4	96.3			91.3	✓		R-3		10'W
9	17.4	98.6					✓	ART		10'E 5'S
10	18.7	93.8		✓		✓				20'S 30'E

Compaction Equipment Used: Vibratory ☒ Non-Vibratory ☐

Smooth Steel Drum ☐

Sheepfoot ☒

Brickfoot ☐

Rubber-tired ☐

Vibratory Plate ☐

Jumping Jack ☐

Walk Behind Steel Drum ☐

Other: _____

(1) Test Location Established By: Grid Lines ☐

Control Points ☐

Estimation ☒

Contractor ☐

(2) Depth Or Elev. Of Test Established By: Survey ☐

Grade Stakes ☐

Estimation ☒

Contractor ☐

(3) Test Conducted On: Full Time Basis ☐

Intermittent Basis ☐

* Proctor No.

Maximum Density (PCF)

Opt. Moisture (%)

Std. Proctor

Mod. Proctor

** Codes: (AR) - Area Re-Rolled

(ART) - Area Re-Rolled & Re-Tested

(R-X) - Retest Of Test No. X

Remarks:

~~10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100~~ #2, 3 RE ROLLED AND PASSED

Technician: Bruce Cani

Date: 6/28/88

Approved: _____

Field Copy

Given To Client Yes ☐ No ☐



Professional Service Industries, Inc.
PTL Division

FIELD DENSITY TESTS

Project Name: FMC RETENTION POND

Client's Name: FMC

General Contractor: BONGIORNO

Excavator: BONGIORNO

PSI Job No.: 427- 80004

Client Job No.: _____

Date: 6/28/88

Weather: SUNNY

Temp. (°F): 80

34

TEST NO.	MOISTURE (%)	DRY DENSITY (PCF)	PROCTOR NO. *	% OF PROCTOR		PASS	FAIL	**	ELEVATION BELOW FINISH GRADE (FT.)	LOCATION GRID COORDINATES OR ROADWAY STATION
				SPEC.	ACTUAL					
11	16.6	98.8	1	90	93.8	✓		R-9	-1'	10'E 5'N From THE North corner
12										
13										
14										
15										
16										
17										
18										
19										
20										

Compaction Equipment Used: Vibratory ☒ Non-Vibratory ☐

Smooth Steel Drum ☐

Sheepsfoot ☒

Brickfoot ☐

Rubber-tired ☐

Vibratory Plate ☐

Jumping Jack ☐

Walk Behind Steel Drum ☐

Other: _____

(1) Test Location Established By: Grid Lines ☐

Control Points ☐

Estimation ☐

Contractor ☐

(2) Depth Or Elev. Of Test Established By: Survey ☐

Grade Stakes ☐

Estimation ☒

Contractor ☐

(3) Test Conducted On: Full Time Basis ☐

Intermittent Basis ☐

* Proctor No.

Maximum Density (PCF)

Opt. Moisture (%)

Std. Proctor

Mod. Proctor

** Codes: (AR) - Area Re-Rolled

(ART) - Area Re-Rolled & Re-Tested

(R-X) - Retest Of Test No. X

Remarks:

Technician: Bongiorno

Date: 6/28/88

Approved: _____

Field Copy

Given To Client Yes ☐

No ☐

APPENDIX F
6 of 7
ORIGINAL (Req)

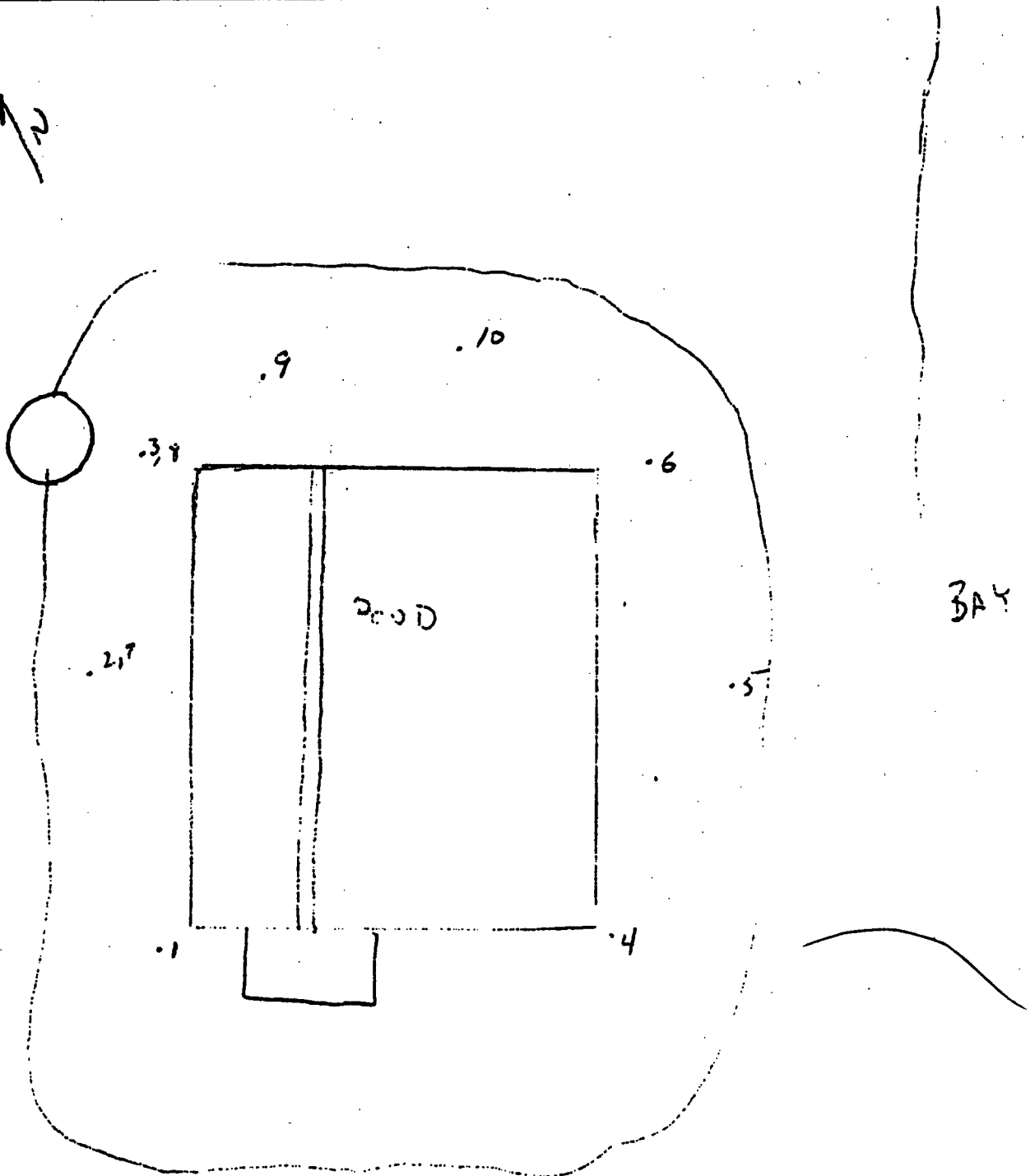


Professional Service Industries, Inc.
PTL Division

808 BARKWOOD COURT
LINTHICUM, MARYLAND 21090
TEL: 301-789-3224
FAX: 301-789-3233
WASHINGTON AREA: 281-2825

FMC

SKETCH



.1 - Densitometer

Sketch No.

PTL-II Order No.

Lab No.

Page 1 of 1

ORIGINAL
(Red)

APPENDIX G
COVER LAYER TEST RESULTS

GENSTARGenstar Stone Products Company
Executive Plaza IV
Hunt Valley, Maryland 21031
Telephone (301) 628-4000ORIGINAL
(Red)

June 1, 1988

Baltimore Asphalt Paving Co.
1320 N. Monroe Street
Baltimore, Maryland 21217
ATTN: John Elliott

RE: FMC - Retention Basin

Gentlemen:

This is to certify that the MD SHA-CR-6/GASB Crusher Run limestone as produced at our Texas, Maryland Quarry meets the requirements of the 1982 Maryland State Highway Administration specifications under Section 903 and City of Baltimore specifications under Article 20.02.

The following gradation analysis is based on the average of 48 individual tests.

<u>SIEVE SIZE</u>	<u>2"</u>	<u>1 1/2"</u>	<u>#4</u>	<u>#10</u>	<u>#200</u>
Texas CR-6/GASB % Passing	100	99.5	36.2	25.8	5.9
SHA Tolerance Range	100	90-100	29-49	--	2-12
Balto. City Spec.		100	25-55	15-45	0-12

This material complies with other specifications as set forth in the Maryland State Highway Administration and City of Baltimore requirements regarding deleterious substances, abrasion and soundness.

Respectfully submitted,

GENSTAR STONE PRODUCTS COMPANY

Ronald L. Heckel
RONALD L. HECKEL
Manager, Quality Control
Aggregates

RLH:kr

cc: J. Schwoerer

ORIGINAL
(Red)

Exhibits



O'BRIEN & GERE



DEPARTMENT OF THE ENVIRONMENT

201 WEST PRESTON STREET • BALTIMORE, MARYLAND 21201

AREA CODE 301 • 225-5647

William Donald Schafer
Governor

Martin W. Walsh, Jr.
Secretary

October 6, 1987

CERTIFIED MAIL
Return Receipt Requested

Mr. Darryl Palmer
Environmental Manager
FMC Corporation
Agricultural Chemicals Group
1701 East Patapsco Avenue - Box 1616
Baltimore, Maryland 21203

Dear Mr. Palmer:

The Waste Management Administration (WMA) has received no further comment concerning the closure of the storm water Retention Basin, since the hearing held on September 17, 1986. The WMA approves the closure plan as modified by a letter from FMC dated July 30, 1987 and a letter from WMA dated August 4, 1987. In accordance with the approved closure plan the post-closure permit application shall be submitted within 15 days and closure operations shall begin within 90 days upon your receipt of this letter.

As the public notice of the hearing for the closure was provided at the same time as the public notice for the incinerator permit, there will be one invoice for both notices. You should receive the invoice shortly, as it will be included with the incinerator permit.

If you have any questions concerning this matter, please contact Ms. Monica Miller of my staff at (301) 225-5701.

Sincerely,



Ronald Nelson, Director
Waste Management Administration

RN/lak

cc: Mr. William E. Chicca
Mr. Alvin Bowles
Mr. Charles Lewis
Mr. Reid Rosnick
Ms. Monica Miller
Mr. John Humphries

ORIGINAL
(Red)